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AUGUST 14, 1948

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

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Penetrating the Deep

See Page 29

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GUARDIANS OF RURAL ELECTRIC SERVICE—These devices, called GR circuit reclosers, will be installed on rural electric lines to guard against prolonged service interruptions. These units reclose the electric circuits automatically following such interruptions as might be caused by overloads, short circuits or other temporary difficulties. The work is being done at Westinghouse Electric Corporation's East Pittsburgh Works.

MEDICINE

Hope of Quick Polio Test

French scientist has developed simple test which consists of injecting material from a suspected polio victim into the brains of mice. Requires more study.

► **HOPE** of a quick and simple test for the infantile paralysis virus to replace the expensive monkey test now used is revived by a report from Dr. Pierre R. Lepine, of the Pasteur Institute, Paris, to the journal *Science* (Aug. 6).

Such a test would help doctors tell positively whether a child with a little fever and upset stomach, for example, is infected with the polio virus or just having an attack of the now prevalent "summer gripe."

In addition, it would speed trials of new drugs for polio, since doctors trying them could be sure they were given to actual cases of infantile paralysis. At present this is difficult to determine and lack of such knowledge means a drug must be tried in very many cases before doctors can be sure it is successful.

Efforts to learn how epidemics spread could also be speeded by a simple test in-

expensive enough to perform on every suspected case.

Dr. Lepine's test is simple enough. Essentially, it consists in injecting material (feces) from suspected polio patients into the brains of five mice. Two days later the mice are given an injection into the brain of active Lansing mouse-adapted polio virus. At the same time another five mice are injected into the brain with the Lansing virus only. Within 10 or 11 days, at least four out of five of these last mice should be dead or paralyzed. But at least three out of five mice also injected with the suspected polio material should be alive and well. The virus they got from the patient would have protected them against the fatal dose of Lansing virus that killed or paralyzed the control mice. If the material did not protect them, the patient did not have polio.

This kind of test, called interference

protection, has been tried before by other scientists but has not proved successful. Whether the details of Dr. Lepine's test, such as method of concentrating the material from patients, method of inoculation and time intervals, will make the difference between success and failure of the test remains for future study to determine. Also to be learned is whether the test will succeed with other strains of polio virus.

Science News Letter, August 14, 1948

CHEMISTRY

Synthetic Resin Makes Deciduous Woods Usable

► **THANKS** to a synthetic resin, woods such as maple, beech, birch and poplar can be used to make a paper of excellent quality, the National Bureau of Standards revealed. Woods formerly little used may now help ease the shortage of printing stock.

Most papers made from wood come from the evergreen spruce, fir, hemlock and pine, with some other wood used to supplement them. Deciduous woods, from trees that shed their foliage annually, are now used only as filler in the manufacture of high-grade printing paper. They do not produce the primary qualities of strength and resistance to surface pick in the usual methods of processing. However, with the addition of melamine formaldehyde, the resin employed, they acquire the desirable qualities.

The discovery of the process for using deciduous woods in papermaking is important because the supply of the ordinary woods used is rapidly decreasing. Large quantities of the non-coniferous trees are available, and the process provides an economic use for them.

In conventional papermaking, the fibers are prepared for fabrication by mechanical beating in water. Beating causes the fibers to absorb water and form a gel-like film on their surfaces by a structural change called hydration. This gel is the cement that bonds the fibers together to give paper of conventional manufacture its strength.

The beating, however, is accountable for unwanted qualities. It promotes some of the most troublesome behavior of paper in printing, including high expansion, excessive curling, slow oil absorption, and show-through of images.

The new technique substitutes the synthetic resin bonds between the fibers for the gel-like bonds formed by hydration. The resin bonding gives strength with only a fraction of the beating required without it, and it produces a superior paper by elimination of the adverse effects of hydration.

Several types of synthetic resins were used by the National Bureau of Standards, but the melamine-formaldehyde resin gave the best results to date. Surprisingly small amounts of this resin are required, usually less than 3% by weight.

Science News Letter, August 14, 1948

MEDICINE

Radioisotopes Cancer Aid

Iodine, gold and cobalt, made radioactive, hold the greatest hope in the fight against cancer. At present, this form of treatment is still in its early stages.

► **EXPLODING ATOMS** are among science's greatest hopes today in the fight against cancer.

Just as radium and the surgeon's knife can be used to destroy some malignant tissue that is cancer, so radioactive elements resulting from the processes of the atomic bomb can be used to wipe out some malignant growths.

Iodine, gold and cobalt in radioactive forms are the most promising of the potential anti-cancer radioisotopes.

No scientist would be foolhardy enough—or cruel enough to cancer victims—to hold out too much hope in individual cases. Nevertheless, the years of human life to be saved by future applications of radioisotopes promise to compensate many times over the loss of human life due to use of the atomic bomb in warfare—if the world can arrange not to use the atomic bomb as a weapon in the future.

When the cancer is in the thyroid gland, radioiodine is used as a means of diagnosis and often as treatment. The thyroid gland picks up and utilizes nearly all of the iodine in the human system, normally about 80 times as much as any other tissue.

When the uranium atom splits up—fission, it is called—as it does in the atomic bomb and in the more peaceful chain-reacting uranium pile, one of the many elements formed is a special kind of iodine with a weight 131 times the mass of the hydrogen atom. This special fission-made iodine gives off powerful gamma rays, like radium does. It can therefore destroy human tissue if it can get at it. Since it is attracted to thyroid tissue, it can be used to destroy it, whether or not it is diseased. Separate out this particular kind of iodine from all the many products of uranium fission as the Atomic Energy Commission does at Oak Ridge, Tenn., feed it to the patient and the radioiodine will go to the thyroid and do its work. Fortunately, this kind of radioiodine is relatively short-lived, half of it losing its activity in eight days. So it is relatively safe to use, since it will not go on with its lethal bombardments when they are no longer needed.

For treating over-active thyroid glands, a condition known as toxic goiter, radioiodine has been very successful. The Mayo Clinic reports success in 80% of the cases treated. Radioiodine also helps to diagnose the disordered thyroid, whether it is over-active, underactive or cancerous. It is also used as a tracer to locate the deposits of thyroid cancer tissue in various parts of the body far removed from the parent growth—metastases they are called.

The results of treatment of thyroid cancer with radioiodine have not been nearly as satisfying as the treatment of toxic goiter. The latest report of the Atomic Energy Commission explains that malignant thyroid tissue often does not pick up as much of the radioactive iodine as does the normal thyroid tissue. Much research is underway, some of it very promising, particularly attempts to put the radioiodine in organic compounds that will be selectively absorbed by cancerous tissues.

At the Sloan-Kettering Institute for Cancer Research in New York, animal experiments are testing whether natural antibodies can be made to carry radioiodine to special parts of the body, such as the liver and kidney, there to administer strong doses of radioactivity.

The metal cobalt when irradiated in the Oak Ridge pile emits radiations similar to those of radium. Since it can be made inexpensively and fabricated into special applicators, it will come into general use for cancer treatment when handling and dosage are worked out.

The radioactive form of phosphorus is

being used to treat leukemia, a cancerous condition of an excess of white corpuscles in the blood, and results are as effective as X-ray therapy without causing uncomfortable radiation sickness. This use is based upon the fact that phosphorus concentrates in the blood-producing centers.

Treatment of cancer by radioisotopes is still in its early stages. Much more must be learned about basic bodily processes generally, and specifically what molecules concentrate in diseased body tissues and can therefore carry to them the exploding atoms that can blast out the disease.

Science has had ample supplies of radioisotopes for only a short time as scientific progress goes. The first shipment of a radioisotope was made from Oak Ridge just two years ago (Aug. 2) and it was radiocarbon 14, a substance that Massachusetts General Hospital research hints may be absorbed rapidly by diseased tissue when it is incorporated in protein compounds.

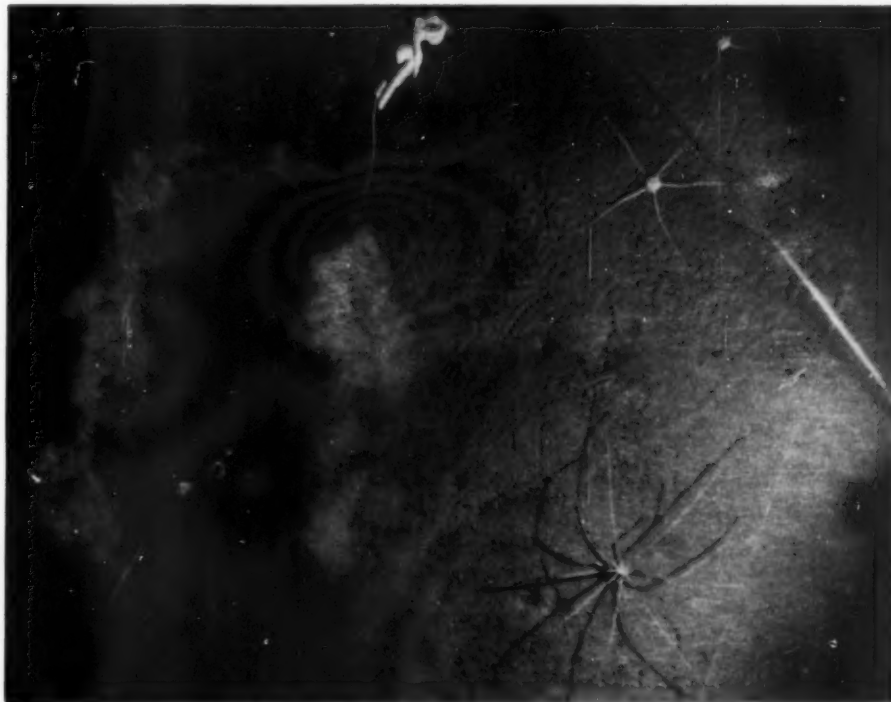
Science News Letter, August 14, 1948

PHOTOGRAPHY

Photographs of Sea-Life Taken at 3.5 Mile Depth

See Front Cover

► "LOWEST-DOWN" of all photographs thus far taken in the sea is one just brought back from the North Atlantic by the Woods Hole Oceanographic Institution research vessel *Atlantis*.



6,000 FEET UNDER THE ATLANTIC—The sea spider, about 28 inches across, and a few brittle stars were snapped by an underwater camera some 100 miles south of Cape Cod. The cloud is caused by the arrival on the bottom of the fishline which was attached to the camera.

Taken with a special pressure-resistant camera and brilliant flash bulbs at three and one-half miles' depth, the picture on the cover of this week's SCIENCE NEWS LETTER shows on the bottom a colony of roughly elliptical objects believed to be

sponges.

Another picture, taken at the relatively shallow depth of 6,000 feet (not much more than a mile) shows several brittle-stars and a sea-spider.

Science News Letter, August 14, 1948

Letters To The Editor

Big Sister Unhappy

You said in an article about soap operas (SNL, July 3) that "Big Sister is happily married." I happen to listen to that program and I know that Big Sister is very unhappily married on the program and isn't living with her husband.—Miss S. Richman, New York City.

When the study was made in 1945-1946 Big Sister was happily married. The findings made at that time still hold true for Big Sister inspires her listeners by her unselfishness and wisdom in dealing with others.

Boring Into Wood

I saw leaf-cutter bees this year at my brother-in-law's farm in Devon, Kansas. They look like you say they do (SNL, July 24), but instead of eating on the roses they bore holes in the wood. He is after them all the time as they are destroying the wood in the barn and house.

He told me there was a barn near him that is almost eaten up by these bees and they have cutters in front of them just as you said. They do look like bumble-bees only slimmer.—Mrs. Harry Glick, Dawn, Mo.

Your observation on the habits of the leaf-cutter bee is correct: the insect does dig holes in wood. These are to be its home: it lines them afterwards with the cuttings it makes from the leaves of roses and other plants.

For protection, here are two suggestions: (1) Paint. The leaf-cutter won't go through a covering of paint to get at wood. They always do their work in unpainted wood. (2) If painting is not practicable, apply a strong solution of DDT, residual-type, using either whitewash-brush or spray-gun.

Not Poisonous

In an article headed "Poison Gas in Atmosphere" (SNL, July 3) the text indicates that methane is described as a poison gas. My personal experience with methane, and the available literature regarding toxicity of methane toward human beings, indicates that methane can not be described as a poison gas.—Thomas S. Bacon, Dallas, Texas.

Thanks. In a strict sense methane is not a poisonous gas. Authorities inform us that although suffocation could be caused if sufficient methane were in an occupied space, experiments in which methane and oxygen were mixed in proportion of 80% methane and 20% oxygen demonstrated that animals could live unharmed in such an atmosphere.

Science News Letter, August 14, 1948

PHYSICS

Ultrasonic Sound Waves Detect Flaws in Metals

➤ HIGH-FREQUENCY sound waves, far too high for the human ear to hear, are being used by General Electric to discover and record small flaws in metals.

A new device, developed to permit the use of these waves called ultrasonic by scientists, shoots 1,000,000 cycle-per-second sound waves through the metals to be tested, and simultaneously plots a graph which shows any flaws in the metal's interior. Testing is carried out by immersing the metal specimen in oil, because these sound waves will not travel through air.

A small sound-wave transmitter, wired to the main body of the instrument and also immersed in the oil, sends the waves through the oil and through the metal sample. Waves are interrupted by a crack or other flaw in the metal, and the flaw is indicated on the graph. The transmitter is a small crystal which is made to vibrate and produce sound waves by an electric current. The receiver has a similar crystal.

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Question Box

AERONAUTICS

What does "Blackhawk" stand for in aviation vocabulary? p. 105

What will allow planes to safely take off and land across the wind? p. 102

AERONAUTICS-METEOROLOGY

What effect does lightning have on the pilot of a plane? p. 108

ENGINEERING

To what new use has the bazooka principle been put? p. 103

Photographs: Cover, p. 99, D. M. Owen, Woods Hole Oceanographic Institution; p. 98, Westinghouse Electric Corp.; p. 101, Gulf Oil Corp.; p. 103, General Electric Co.; p. 106, Robert E. Cox, Harvard Observatory; p. 107, California Institute of Technology.

GEOPHYSICS

What device is used in the search for hidden oil? p. 101

MEDICINE

What are radiolotopes doing for cancer? p. 99

What method holds hope of a quick polio test? p. 98

What tropical disease is feared to be prevalent? p. 101

PHYSICS

How are flaws being detected in metal? p. 100

MEDICINE

Parasite Poses Problem

Amebic dysentery, a tropical parasitic disease that riddles the intestines, may be more prevalent than suspected. Fear many are "carriers."

► A LARGE PORTION of our population may be harboring a dread tropical disease that bores into the intestines and makes chronic patients of its victims.

One million veterans and 15,000,000 men and women in civilian life may be playing host to amebic dysentery, the parasitic tropical trouble-maker.

This estimate, based on the findings made at the Veterans Administration's Tropical Disease Clinic, Winston-Salem, N. C., under the direction of Dr. Thomas T. Mackie, professor of preventive medicine at the Bowman Gray Medical School of Wake Forest College, appeared in an article by Chester S. Davis in the *Winston-Salem Journal* and *Twin City Sentinel* (Aug. 8).

(In Washington authorities pointed out that the results at Winston-Salem may apply only to the veterans examined and may not be typical of the nation-wide situation.)

Mr. Davis's estimates are based on the fact that of 330 veterans examined in this clinic in the past 18 months, 134, or 40.6%, had amebic dysentery. Another 46 veterans were found to have other tropical diseases. He states that "in less than one percent of the cases had these diseases previously been diagnosed, although most of the infestations already were four and five years old."

Men who came to this clinic for the

most part had vague, undiagnosed complaints that refused to respond to treatment elsewhere but presumably they were suspected of having tropical disease when sent there and that may weigh the figures in these findings.

However, the magnitude of this problem has increased with the return of many men from service in tropical areas who may be unsuspected casualties of the disease. These are the facts presented by Mr. Davis:

A person may be chronically ill for many years before the true nature of his infection is discovered, for few doctors are trained to detect it. There probably are not more than 12 fully trained men actively practicing tropical medicine in the U. S. Many persons may be carriers, for the amoebae surround themselves with hard shells and these cysts are passed in the feces to find another victim. There is no cure for this intestine-riddling disease when allowed to progress too far.

A one-celled protozoa is the parasitic agent in this disease which over a period of time may riddle the intestine with small, round ulcers. In these aggravated cases the painful "bloody flux" is a common symptom. The amoebae may get to the liver via the blood vessels and there produce inflammation and abscessing that may lead to death.

Science News Letter, August 14, 1948

GEOPHYSICS

"Doodlebug" Hunts Oil

► THE INNER WORKINGS of the wartime "doodlebug" pest to German U-boats in the Atlantic were revealed at the Westchester County Airport, N. Y., by the Gulf Oil Corporation to a group of science writers. Its application to oil surveys was also demonstrated.

Its proper name is the magnetometer. It is a device housed in a bomb-like structure which is trailed behind and below an airplane. Its delicate magnetic instrument reacts to magnetic influences below, even to a submarine concealed deep in the ocean. It was used during the war, and since, to locate hidden iron ore deposits. Its greatest use today is in the search for petroleum, even oil under swamps and in the ocean bed.

It has already been used in many surveys for oil, including an 85,000-square-mile area of the continental shelf in the region of the Bahama islands where other scientists, working under giant diving bells,

used gravity methods. The magnetometer method is now being used to explore a great tract in Africa with American planes and American instruments. Many other surveys have been made over dry land and almost inaccessible swamps. One great value of the magnetometer is its ability to survey hard-to-get-at areas, and do it with great speed.

The magnetometer reacts to the earth's magnetism in addition to iron and steel objects and to deposits of magnetic ore. As explained by Gulf scientists, the earth's magnetic field varies in intensity. The variations of importance in oil explorations are those caused by differences in composition and proximity to the surface of the magnetic igneous rocks which comprise the underlying or basement rock found in all areas.

When the structural configuration, or form, of these basement rocks is such as to bring them relatively close to the surface,

a magnetically high area will be indicated by the instruments. Thus, by the variations in these magnetic measurements the geophysicists secure information which permits them to make a contour map, which shows variations in the composition and structure of the earth's basement rock.

The overlying sedimentary rock may reflect a similar configuration, which can indicate the existence of geological conditions permitting the accumulation of oil.

The heart of the magnetometer is a magnetically sensitive element about the size of a cigarette. Its findings are transmitted to the instrument in the plane through the trailing cable. The air-borne magnetometer's success is due in large part to its ability automatically to orient itself at all times so that it is in perfect alignment with the earth's magnetic field.

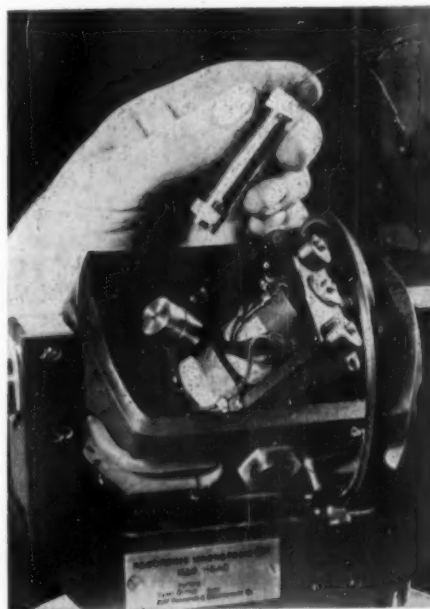
Science News Letter, August 14, 1948

MEDICINE

Fever Plus Penicillin Has More Anti-Syphilis Effect

► A TEN PERCENT improvement in syphilis treatment is obtained when artificially induced fever is added to the seven and one-half day penicillin treatment, a group of doctors headed by Dr. Herman N. Bundesen, president of the Chicago Board of Health, reported in the *Journal of the American Medical Association* (July 31).

Penicillin alone rated 70% effective and



NERVE CENTER—Heart of the air-borne magnetometer, housed in a bomb-like structure which is lowered beneath a moving airplane, is the small tube-like piece being held by the hand in the photograph.

penicillin plus fever 80% effective, they report from six months studies at the Chicago Intensive Treatment Center.

The fever treatment does not cut down on the time required for penicillin treatment of syphilis. Neither does giving larger amounts of penicillin without fever prove more effective.

The 80% effective method consisted of an injection of sodium penicillin every three hours for 60 doses plus three sessions,

each three hours long, of artificial fever on alternate days beginning 23 hours after the first injection of penicillin.

The doctors reporting the study with Dr. Bundesen are: Drs. George X. Schwemlein, Kettering Foundation for Medical Research, Cincinnati; Theodore J. Bauer, U. S. Public Health Service; Robert M. Craig, Dayton, Ohio; and Jack Rodriguez, Chicago.

Science News Letter, August 14, 1948

AERONAUTICS

Cross-Wind Landing Gear

► LIGHT AIRPLANES, equipped with relatively new types of cross-wind landing gears, can take off and land across the wind as safely and with no more skill required than in ordinary into-the-wind operations, the Civil Aeronautics Administration revealed in a recent report.

This government agency initiated an investigation of the possibilities of cross-wind landing gears for airplanes in 1945. One objective is to save costs in airport construction. Modern ports at the present time must have sufficient runways to enable airplanes to be landed directly into the wind, or not more than 22.5 degrees from directly into the wind, for all winds in excess of four or 10 miles per hour. This means extensive tracts of land for airfields and much heavy expensive construction.

The report, entitled Cross-Wind Landing Gears, covers tests made with two light planes, a Fairchild PT-19 and the Piper J-3. Several other planes with cross-wind landing gears have also been tested and will be covered in a later report.

Basically this cross-wind landing gear consists of castored wheels with castoring restraint. The idea is not new. The Bleriot

plane, which made the first flight across the English Channel, in 1910, was equipped with one type. An American patent was issued Bleriot in 1911 for his so-called undercarriage.

Also some early planes were equipped with the tricycle type undercarriage which incorporated main fixed wheels behind the center of gravity of the plane and a castored nose wheel. This might be termed a cross-wind landing gear.

Prior to World War I, the castored and tricycle type undercarriages had been almost universally discarded in favor of undercarriages having two fixed wheels ahead of the center of gravity and a castored or steerable tail-skid or V-wheel.

The present cross-wind landing gears were not designed by the government but by individual airplane manufacturers at the suggestion of the CAA. The two covered in the present report have been flown by some 200 pilots, none of whom gave an unfavorable report on either landing or take-off characteristics. Cross-wind landing gears for heavier planes, including transports, are expected soon.

Science News Letter, August 14, 1948

ENGINEERING

Home Heating Studied

► A SPECIAL BUILDING to study home heating stoves and furnaces now in operation, in London, has many unique features all designed to provide accuracy in the research activities. It is called a calorimeter building because calorimeter cabinets, in which individual heating appliances can be installed and tested, constitute its principal feature.

The building is a four-story brick structure occupying a ground area of about 3,000 square feet at Greenwich. Its four calorimeter cabinets, about the size of living rooms in small houses, are centrally mounted within larger rooms in which the temperature can be kept constant. The cabinets are designed so that heat from within passing through the walls, floor and ceiling is automatically measured.

The cabinets are of air-tight construction with specially balanced draft arrangements

to eliminate leakage and to enable the amount of incoming air to be measured. The total useful heat from the heating appliance can thereby be determined by direct measurement. It is also possible to measure separately radiant heat, warmed air from convection jackets, and heat to the boiler water.

These calorimeter chambers are on the ground floor. Above them are smoke-testing rooms. The chimneys from the cabinets pass through these upper rooms. They are equipped for smoke measurements. The rest of the building is occupied largely by laboratories and the equipment to keep the constant temperatures required surrounding the calorimeter cabinets. For summer-time use, and for appliances of high heat output, cooling is provided by a refrigerator system.

The calorimeter cabinets are constructed

of quarter-inch plywood panels, covered on both sides with copper sheeting divided into two by 1.5 foot sections. Differential thermocouples are embedded at the mid-points of each copper section, directly opposite each other on the inside and outside of the plywood panels. This permits the temperature difference across the walls, floor and ceiling to be measured and recorded electrically.

In order to measure the smoke in the smoke-testing rooms, a beam of light is sent through each flue through special windows for the purpose. The intensity of the smoke is measured by a photocell. Smoke samples can be taken from each flue for other tests by means of a smoke sampler which can be inserted into the flue and then removed.

Science News Letter, August 14, 1948

PHYSICS

"Superfluid" Is Neither Liquid, Solid Nor Gas

► A "SUPERFLUID" which leaks through the tiniest openings and apparently defies gravity by flowing uphill was described by a Massachusetts Institute of Technology scientist.

The "superfluid" is helium, the second lightest element, cooled to 457 degrees below zero Fahrenheit. At that temperature, within a degree of absolute zero, helium is neither a liquid like water, a gas like steam, nor a solid like ice. It is a fourth state of matter, called superfluid.

Prof. Laszlo Tisza, Hungarian physicist at M. I. T., describes the strange behavior of helium at very low temperatures in *Physics Today* (August), a publication of the American Institute of Physics.

Here are some of the startling properties of this superfluid:

It conducts heat better than any other known substance.

It leaks between two pieces of optically-ground glass pressed together.

Slightly heated, by a flashlight bulb, it squirts out of a tube to form a fountain eight inches high.

Part of it will creep up the side of a container.

Unlike any other known substance, it will not freeze at temperatures near absolute zero.

Prof. Tisza suggests that this fourth state of matter might also be called "quantum liquid," because it supports the quantum theory that molecules move at absolute zero. Classical theory held that all motion should cease at absolute zero.

Helium with an atomic weight of three instead of the usual four should, according to the laws of quantum physics, prove even more weird in its behavior. It may not form a liquid at all or may form a liquid with entirely strange properties. Attempts are being made to obtain rare helium three in large enough quantities to make experiments.

Science News Letter, August 14, 1948

ENGINEERING

Jets Blast Well Casings

Bazooka principle is being successfully used in a new method of perforating oil well casings. Greatly increased flow is claimed.

► THE WAR-FAMED BAZOOKA, which enabled a single man to pierce enemy armor-coated fighting tanks or to destroy concrete structures with a blast or two from a hand-carried weapon, is now in use in increasing the flow of petroleum into deep, partly exhausted oil wells where the pumps can capture it.

It is a modified bazooka, of course. When lowered within the casing of the well and detonated it shoots jets through the casing walls and deep into the surrounding formation. It is designed to replace the bullet-shooting device, long used, which makes openings through which the oil can flow.

This new method of perforating oil well casings was developed in Fort Worth, Texas, by Welx Jet Services, Inc., and although less than a year old has already successfully been used on 150 wells, some low-producing new wells and others which had reached the stripper-well status. Greatly increased flow is claimed for every application.

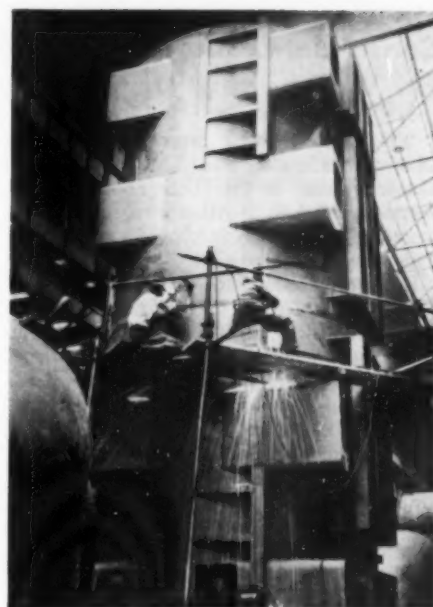
Unlike a bullet, which is a metal projectile propelled by expanding gases, the Welx jet is a high-velocity, directionally controlled penetration force which derives

its tremendous energy from the electronic detonation of a special powder. With a velocity of some 25,000 feet per second, every jet shot penetrates the casing pipe in the well and far back through surrounding cement and formation. It is said to be far more effective than the bullet method.

The success of the bazooka rocket, which proved far more effective than bullets as armor-piercing tank destroyers, and the success of the Welx Jet as well, depends upon the detonation of so-called "shaped charges." It goes back to what physicists know as the "Munroe effect" which was announced to the world in 1888 by Prof. Charles E. Munroe.

He found that if a hollow is made in an explosive cartridge on the side toward the object to be blasted, the effect is greatly increased. The hole can be a conical cavity or hemispherical in shape. The principle is already in use in certain types of mining operations. Its first use in war was probably in the bazooka rocket which made it possible for one man to blast his way successfully through thick concrete with an explosive that he could carry in his two hands.

Science News Letter, August 14, 1948



GIANT TURBINE GENERATOR
—Two 15-foot sections of the frame of a 150,000 kilowatt generator are shown being welded in General Electric's turbine shop in Schenectady. It will weigh more than 400,000 pounds, including core and windings, and will furnish enough power to light a city of 450,000 people.

Winheim of St. Louis, vice-president of International Leather Chemicals, Inc. and Dr. Edward Doherty of Buford, Ga., technical director of Bona Allen, Inc., produces leather comparable to those from good vegetable tannage at a cheaper cost. It also makes possible greater versatility by giving the leather a wide range of characteristics.

With the wiping out of the chestnut trees, America's former greatest domestic source of tannins, much research has been undertaken to find chemical tannage for heavy leathers. Fine leathers can be made with synthetic agents, called syntans, but these compounds have not been accepted for heavy leathers.

In the new process, the prepared hide is first treated with a compound of the dialdehyde type, such as glyoxal, and then with resin-forming agents, such as urea or phenol (carbolic acid), or with combinations of these substances and formaldehyde.

Controlled acid treatment with formaldehyde yields leather of high quality. The rigidity which might result from the process is prevented by the addition of a blocking agent. Versatility in the characteristics of the leather is obtained through variation in the resin-forming compounds or the blocking agent.

Details of the Winheim-Doherty process were described in *Industrial and Engineering Chemistry* (August), a publication of the American Chemical Society.

Science News Letter, August 14, 1948

PUBLIC HEALTH

WHO Plans Its Program

► PEOPLES of the eastern Mediterranean region and east Asia will be the first to be helped to better health by the World Health Organization.

This was revealed by Dr. Thomas Parran, U. S. Public Health Service, and Dr. Martha Eliot, U. S. Children's Bureau, on their return from the first World Health Assembly held in Geneva, Switzerland, in July. Drs. Parran and Eliot were two of the U. S. delegation to the assembly. Third U. S. delegate was Dr. James R. Miller, a trustee of the American Medical Association.

WHO activities will be decentralized as much as possible, the assembly decided. Headquarters will be at Geneva, but there will be six regional centers, each with its own administrative headquarters. The six regions determined on are: the western hemisphere, Africa, the eastern Mediterranean, southeast Asia, the western Pacific and Europe.

Malaria, tuberculosis, venereal diseases, maternal and child health and environmental sanitation will be the chief concerns of the World Health Organization.

These five were picked by the World Health Assembly after consideration of what could be done to improve world health with WHO's present rather sharply limited overall budget of \$5,000,000.

Certain functions of the League of Nations Health Section and the International Office of Health of Paris, concerning exchange of information on epidemics, new methods of treating disease, standardization of drugs and so on, have been inherited by WHO and will also be carried on.

Special budgetary provision has also been made for aid to countries in case of national health emergency such as the cholera epidemic in Egypt last year.

Science News Letter, August 14, 1948

CHEMISTRY

Cheaper Shoes Promised by Chemical Tanning Process

► A NEW CHEMICAL PROCESS for tanning leather promises cheaper shoes and other heavy leather products.

The process, developed by Dr. A. H.

PUBLIC HEALTH

Consolidate Laboratories For War Against Disease

► THE FIRST STEP in consolidating the national headquarters of the communicable disease fighters of the U. S. Public Health Service was taken in Atlanta when Surgeon General L. A. Scheele accepted from Emory University a 15-acre plot of ground.

From the concentration of laboratories to be placed there teams of doctors and health experts will go forth when necessary to fight the menace of diseases spread by insects and animals.

Malaria is a major problem for the health forces under the command of Dr. R. A. Vonderlehr, since CDC, as the communicable disease control is called, began with the campaign against this mosquito-carried disease. Other diseases they are ready to handle, upon request of local and state authorities, include: yellow fever, infantile paralysis, encephalitis, hookworm, typhus, plague, sand fly fever, amoebiasis, schistosomiasis, filariasis, dengue fever, dysentery and other related infections.

Science News Letter, August 14, 1948

NUTRITION

Latest Breakfast Treat Is Cereal from Prunes

► THE LATEST addition to breakfast menus is a cereal made of prunes.

The new breakfast cereal, made from sieved prunes, was developed by the food technology division laboratories of the University of California in Berkeley. It is termed healthful, tasty, inexpensive and contains more than 50% dried fruit.

One method of making the cereal calls for making a dough of whole wheat flour, white flour, bran, corn sugar, yeast or baking powder and sieved prunes. The mixture is then baked in small loaves, sliced and dried. Finally the slices are crushed and sieved to "grape-nuts" size.

Science News Letter, August 14, 1948

GENERAL SCIENCE

"Statistical Blackout" Charged Against Soviets

► FACTS about the economic life in the Soviet are hidden from the rest of the world not by an "iron curtain" but by a "statistical blackout," a group of American scientists have charged.

The scientists are editors of *The American Statistician*, published by the American Statistical Association. They describe the "blackout" in an editorial (June).

Efforts of the Economic and Social Council of the United Nations to get a picture of present world economic conditions and future prospects are "severely handicapped" by lack of information from the U. S. S. R., the statisticians complain.

When the UN group prepared its "Eco-

nomics Report" without including Russia, the Soviets were the first to complain, the editorial explains. But when Prof. Arutiunian, the Soviet representative, did give his figures, they were little help.

Industrial output in the U. S. S. R., he reported, rose 32% in 1947 over the previous year. Just what this made the industrial output last year, or from what level it had risen from 1946, was not stated. Thus, the statisticians point out, "These figures are of little significance."

For our information on the economy of the U. S. S. R., the editorial continues, we must depend on "a small corps of experts on Soviet economy."

"These men combine economic and statistical competence with detective ability and highly developed imagination."

Their best sources of information, the editorial adds, are "apparent slips and inconsistencies in official Soviet data."

Science News Letter, August 14, 1948

GENERAL SCIENCE

Charge Military Seeking Custody of Atomic Bombs

► SOME MILITARY LEADERS are trying to gain custody of the U. S. stockpile of atomic bombs which were assigned to the civilian Atomic Energy Commission under the McMahon Act, an atomic scientist charged.

In a statement marking the third anniversary of the atomic bombing of Hiroshima, Dr. William A. Higinbotham, vice-chairman of the Federation of American Scientists in Washington, and a physicist at the Brookhaven National Laboratory, declared a battle over military or civilian control of the nation's atomic bomb stockpile is raging under a "cloak of secrecy."

Dr. Higinbotham said that some military men are arguing that atomic bombs are a weapon which should be in the hands of the military. This, the scientist cautioned, would make it "physically possible for military men to make the decision to use the atomic bomb and carry this decision into effect."

"A 'border incident' involving the use of an atomic bomb could not easily be smoothed by diplomacy," Dr. Higinbotham warned.

The Federation, the statement emphasized, feels that atomic bombs "should be retained firmly in the hands of the President and his advisers who have an overall picture of the international political situation."

Attacking secrecy, the scientist said that convenience and not security is to blame for the fact that the debate on control of the bombs has not been contested openly.

"The national security is certainly not endangered by making public the pros and cons of this issue, whether the bomb should be held by civilians or soldiers," Dr. Higinbotham said.

Science News Letter, August 14, 1948

IN SCIENCE

AERONAUTICS

New Bomber Triumph in U. S. Warcraft Progress

► THE RECENT 6,000-mile test flight of the new Air Force giant bomber, the B-36, which took off at a gross weight of 300,000 pounds, indicates the American position in modern warcraft. So also is another new bomber just delivered to the Air Force, the speedy Martin XB-48, powered with six jet engines. (See SNL, Aug. 7.)

The B-36, which took off with the heaviest load ever taken aloft by an airplane, was built by the Consolidated Vultee Aircraft Corporation and is a giant in comparison with the big B-29 which brought the Japanese to their knees. It is said to be the world's largest land-based bomber.

It was designed to replace the B-29, being larger, faster and able to carry greater loads. In addition, it has much greater range. On this 6,000-mile test run it averaged 300 miles an hour and, with a lighter load, could have added another 3,000 miles to its trip. It can make a round-trip from America to central Europe without landing.

This giant bomber, with a bomb-carrying capacity of some 30 tons, is roughly 40% larger than the B-29. It made its first test flight in the summer of 1946. It has a wingspan of 230 feet, is 163 feet long, and has a rudder height of over 37 feet. It is powered with six 3,000 horsepower Pratt and Whitney engines mounted on the trailing edge of the wing which operate pusher-type propellers. The Air Force now has eight of these bombers and 94 are on order.

An important feature of the B-36 is its newly-developed four-wheel main landing gears which distribute its weight over a greater runway area than single-wheel or dual-wheel gears. Because of this it can operate from any base suitable to accommodate the B-29 Superfortress.

The XB-48, built by Glenn L. Martin aircraft company of Baltimore, is powered with six General Electric-Allison jet engines that give it a speed approaching 500 miles an hour. It has a combat radius of more than 800 miles. Its bomb-carrying capacity is over 10 tons. It has a wingspan of 108 feet and a length of 85 feet. A notable feature is its bicycle-type landing gear.

The new Consolidated-Vultee bomber has a brother cargo or troop-carrying plane. It is the C-99, which is capable of transporting 100,000 pounds of cargo or 400 fully-equipped combat troops. It has the same wingspan as its bomber counterpart but is higher and 19 feet longer. In speed and range it equals the bomber.

Science News Letter, August 14, 1948

NEW FIELDS

AVIATION

New U. S. Jet Fighter Is Black for Night Safety

► ADD "BLACKHAWK" to your aviation vocabulary. It is the official name of the U. S. Air Force's newest jet fighter, which is black in color to make it less visible at night and can swoop like a hawk with its four jet engines.

The new airplane is a product of Curtiss-Wright Corporation of Columbus, Ohio. An experimental version has undergone extensive tests at Muroc Base, Calif., and 88 planes of the type have been ordered by the Air Force.

This four-jet fighter, powered by Westinghouse engines, is officially the F-87 in military parlance. Its engines are grouped in pairs away from the fuselage on the wings. It operates with a two-man crew and is designed to be usable under extreme weather conditions. Among other equipment it has the most modern anti-icing devices. Its wingspan is 60 feet, and its length slightly greater. Its speed and range are not yet revealed.

Science News Letter, August 14, 1948

AVIATION

New Antenna for Planes Eliminates Former Drag

► A NEW and unique antenna, for sending automatic or other radio signals from flying objects ranging from planes to rockets, lies flat in the surface of the object and eliminates the drag that is caused by ordinary projecting airborne antenna. An important application will be in planes designed to beat the speed of sound.

The new antenna consists of a rectangular notch cut in the tail surface of the test vehicle which will excite certain portions of these surfaces but will not affect their aerodynamic quality, it is explained by Ralph O. Robinson, Jr., of the Applied Physics Laboratory of Johns Hopkins University at Silver Spring, Md., where it was developed.

It is called a notch antenna, and was designed to provide a radiation pattern suitable for sending automatic radio signals from a test vehicle in flight without interference with its aerodynamic configuration, he states. To do this it seemed essential to use the vehicle's surface, or a portion of it, as the antenna rather than to use a trailing wire or other external structure.

The notch antenna has properties different from the conventional slot antenna and the usual aperture antenna. It consists of a rectangular opening in the leading or trail-

ing edge of a thin portion of the test vehicle structure. It projects into the surface with its long side perpendicular to the edge. It may be filled with suitable plastic material so that it conforms to the original shape of the surface and does not reduce its strength. The notch is fed by a coaxial cable from the transmitting instrument.

The size of the notch is measured in radio wavelengths rather than in the more familiar inches or meters. Its length may range from a quarter to a sixtieth of the wavelength under consideration. Its width is usually less than one hundredth of a wavelength. A single notch in a rocket or plane may be enough for a particular job, or two or more may be used as elements of directional antenna for certain applications.

Science News Letter, August 14, 1948

ELECTRONICS

Synthetic Quartz Crystals May Add to Vital Supply

► QUARTZ CRYSTALS, grown in the laboratory, may add to the supply of these crystals which are vital to radio communication and electronic apparatus.

These crystals are used in radio transmission and long-distance telephony because they can convert mechanical energy such as sound waves into electrical energy—and back again. During the war, tiny wafers of quartz, smaller than a postage stamp, were used to control the frequency of military radios. In the past this country has imported most of its raw quartz from Brazil.

Ernest Buehler and Alfred C. Walker of the Bell Telephone Laboratories told the International Congress of Crystallography at Harvard University how they had been able to produce quartz crystals more than an inch long in a month. They placed silica, a mineral which is found in sand, and a small quartz crystal in an alkaline solution inside a steel bomb. The bomb was then heated to 750 degrees Fahrenheit at a pressure exceeding 15,000 pounds per square inch.

Crystals produced in this way are not substitutes. They have the same composition as quartz crystals found in nature. Since they are grown under specially controlled conditions, they even tend to be superior to most natural crystals.

Experiments have been so successful, the Bell scientists said, that commercial production of quartz crystals in the near future seems likely.

Danforth R. Hale of The Brush Development Company of Cleveland told of experiments in which silica, a small crystal of quartz and water were placed in heavy pressure vessels at a pressure of several thousand pounds per square inch and cooked at a temperature close to that of a very hot flat iron. In one of these experiments the small crystal increased in size 12 times in about 60 days.

Science News Letter, August 14, 1948

MEDICINE

Plenty of Anti-Polio Drug At Hand in Epidemic Area

► PLENTY of Darvisul phenosulfazole, new anti-polio drug now getting clinical trials, is available for three medical centers in North Carolina for trials on polio victims during the current infantile paralysis epidemic in that state, a spokesman for Lederle Laboratories, American Cyanamid Company, said. Lederle Laboratories make the drug which is also undergoing trials in Texas, scene of another polio epidemic this season.

The medical centers in North Carolina are the Bowman Gray Medical School of Wake Forest College at Winston-Salem, the University of North Carolina Medical School at Chapel Hill, and Duke University School of Medicine at Durham.

Presumably the drug will be used not only for patients at these medical centers but also will be sent to physicians in other parts of the state who will cooperate with the medical centers in proper testing of the drug.

Science News Letter, August 14, 1948

PHYSICS

Atoms Are Pushed Out of Place in Smashed Metal

► IF YOU HIT a piece of metal with a hammer you are actually knocking the tiny atoms in it out of position.

Drs. B. L. Averbach and B. E. Warren of the Massachusetts Institute of Technology reported at the International Congress of Crystallography held at Harvard University that smashing metal broke up the arrangement of atoms in the material.

The scientists placed blocks of deformed and normal metal in an X-ray beam and measured the amounts of energy scattered in various directions by the atoms in the metal. The blocks that had been damaged scattered more energy in certain directions than the unharmed ones, indicating that groups of atoms in the metal had been broken up.

A metal which is so sensitive that even light shining on it will cause the atoms to rearrange themselves was described to the conference by a group of British and American scientists.

The metal, barium titanate, was discussed by H. F. Kay and R. G. Rhodes of the University of Cambridge, England; Elizabeth A. Wood, B. T. Matthias and G. C. Danielson of Bell Telephone Laboratories, and P. W. Forsbergh, Jr., of M. I. T.

Sensitive atoms of barium titanate show a remarkably quick response to the slightest changes in pressure, temperature or electricity. Although the substance is now classed as a laboratory curiosity, the scientists predicted that important applications may be found for its unique properties.

Science News Letter, August 14, 1948

ASTRONOMY

Wide-Angled Telescopes

These mighty candid cameras are being used to find out more about the Milky Way galaxy of which the earth is a part. Little is known of its appearance.

By MARTHA G. MORROW

► WIDE-EYED TELESCOPES, that take in large areas of the sky at a glance, are exploring the Milky Way system of stars to which our sun and earth belong. These mighty candid cameras of the heavens produce astronomy's best images of near and distant stars.

This newest family of telescopes is also useful in tracking the flight of V-2 rockets. Conceived less than two decades ago by the late Bernhard Schmidt, German instrument maker, further improvements have been added by the brilliant optical designer, Dr. James G. Baker of Harvard University. The most advanced of this new kind of telescope, the Baker-Schmidt, is now under construction.

"Schmidt telescope-cameras are contributing largely to the solution of some of the most urgent present-day problems in astronomy," stated Dr. Harlow Shapley, director of Harvard Observatory where pioneering research on our Milky Way galaxy is being conducted. "We are finding out what kind of universe we belong to and where we are headed," he said.

Central Plane

The bright, star-studded band of the Milky Way visible any clear night outlines the central plane of our own star-system. A hundred billion stars or more belong to it.

Milky Way dimensions are not astounding by astronomical yardsticks, but very large by earthly standards. Some stars in our own Milky Way universe are so far away that the starlight which reaches us these summer nights started on its way ten to twenty thousand years ago.

As yet we know little about the appearance of our own galactic system. Being on the inside looking out, we can only guess that it is spiral in shape. Our sun is located in a cloud of stars in the outer part of the system, well beyond the main body of the spiral.

We are far from the galaxy's dense central cloud of stars, nebulae and other luminous material. There may even be a relatively star-empty region between us and the center of the Milky Way galaxy.

More observations are needed to settle this and other questions about our near neighbors in space. The family of Schmidt telescopes will be the explorers in this project, making available the information we need.

Instruments of this type, rarely used for

visual observation, are notable because they produce superb images over a relatively large area. On a photographic negative they record a portion of the sky as much as a hundred times larger than the photographs taken with a large reflecting telescope. They have great speed, so many pictures can be made on a single clear night. They are less sensitive to atmospheric disturbances than the long-focus reflectors.

Not only are these telescope-cameras important in exploring the heavens, but modified forms are used for studies closer at hand. Schmidt-type instruments, by tracking V-2's and other rockets in flight, will help protect us against guided missiles of the future. As a projecting system, this arrangement has been found useful in television reception.

Unpredictable Happenings

Comets, exploding stars and other outstanding but unpredictable happenings of the heavens can best be detected with such telescopes. It was with a Schmidt that astronomers found a large red nebula, first of its kind. Also two supernovae, the 16th and 17th known to the world of astronomy, were spotted within a fortnight of each other with such an instrument.

Although invented comparatively recently, 40 to 50 members of this family of telescopes are already in existence.

When the four-foot Schmidt at Palomar Mountain, Calif., swings into action late this summer, it will be the largest in operation. It has a 72-inch spherical mirror, thus is much larger than the 48-inch aperture might indicate.

In some ways this instrument has excited astronomers as much as its greatly publicized partner, the 200-inch Hale telescope of the California Institute of Technology and the Carnegie Institution of Washington. The two telescopes are not competitors: each will be far more effective because of the other. The Schmidt, for instance, is excellent for patrolling the heavens and can pick out objects worthy of the "big eye's" time.

The Mexican National Observatory at Tonanzintla boasts a Schmidt telescope with a 26-inch lens, made with Harvard's cooperation. Telescopes of this type with 24-inch correcting lenses are also located at the Oak Ridge observing station of the Harvard College Observatory and the Case Institute of Technology in Cleveland.

A telescope for Harvard's South African Observatory at Bloemfontein is under construction. Its mirror and correcting plate

will both be 60 inches across. Several other large Schmidts are in the making and still others are in the planning stage.

The Schmidt camera is neither a reflector nor a refractor, but rather combines the two since it employs both a mirror and a lens. The first ones used in this country were built by amateurs, though many observatories today have professionally made instruments.

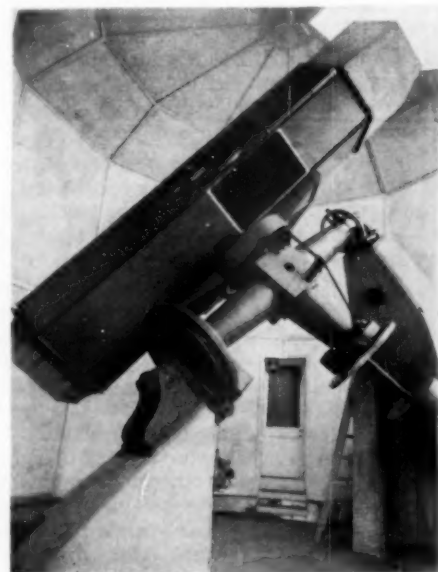
The ordinary reflecting telescope focuses the rays of light from a star by means of a mirror of special design. Rather than being sphere-shaped, it is a paraboloid.

Rays Bent by Lens

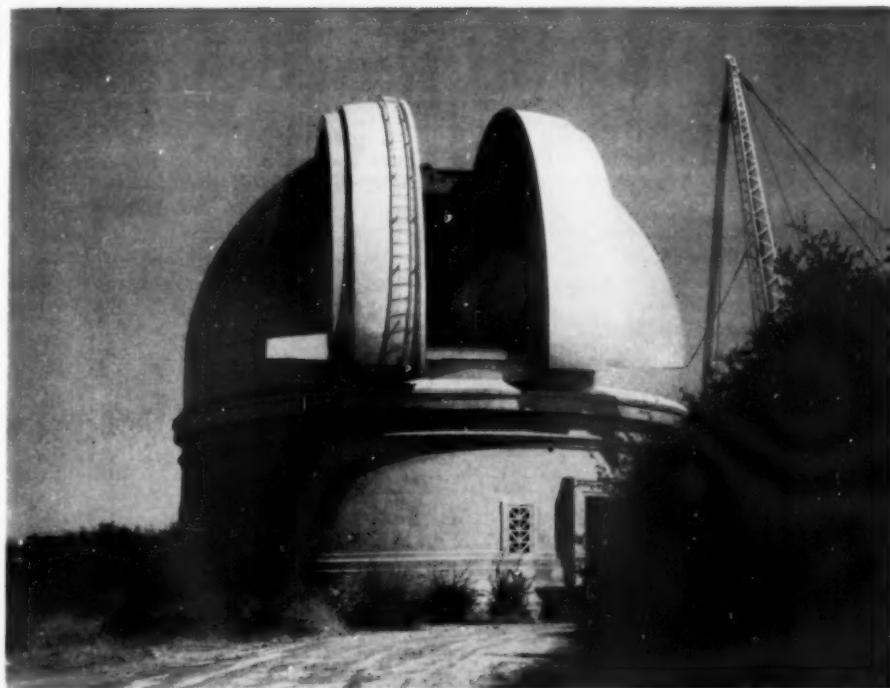
Bernhard Schmidt of the Hamburg Observatory at Bergedorf, Germany, hit upon the idea of placing a specially figured lens far in front of a spherical mirror. Light rays entering the telescope are bent by this lens, before they strike the mirror, in such a way that all are brought to a focus at about the same point.

The correcting lens is partly convex and partly concave. The center is raised as is the edge of the thin disk, while the region in between is slightly depressed. This lens is so thin that the hump in the middle is hardly visible to the unaided eye.

The combination of correcting lens and spherical mirror produces images without distortion out to the very edge of the plate. But the rays which fall near the edge have the same focal length as those that pass near the center. So the photographic film,



CORRECTING LENS—It measures 24 inches across and is part of Harvard Observatory's Schmidt, the mirror of which is 33 inches in diameter.



SCHMIDT DOME—Tube of the 48-inch Schmidt telescope-camera is visible within the dome atop Palomar Mountain.

placed halfway between the mirror and correcting lens, must be bent back a little to give sharp images.

Although a number of ingenious suggestions have been made to improve the Schmidt telescope, those of Harvard's young Dr. Baker are considered the most promising. His advanced design will reduce the length of the telescope and also eliminate the need for curving the plate.

Dr. Baker suggests that a second mirror be inserted within the telescope system. Under the new set-up, light entering

through the correcting lens proceeds to the concave spherical mirror, is reflected back to a convex spherical mirror which reflects it to the film. The second mirror straightens out the light rays so that a sharp image is produced on a flat photographic plate or film.

A telescope of the modified Baker-Schmidt type, the first of its kind to be built, is now under construction. It will have a 32-inch correcting plate and 36-inch primary mirror. The second convex mirror is 17 inches in diameter.

Idea for Telescopes First Used for Lamp

Astronomy's most promising "big baby" among telescopes, the Schmidt-type instrument, might have been born about 20 years earlier. A similar arrangement, in reverse, was applied to searchlights by an American inventor. But it had to be applied to photographing the sky later.

In 1910 the late Dr. Gustav A. Hermann Kellner was granted patent No. 969,785, which he assigned to the Bausch and Lomb Optical Company, on "A Projecting Lamp." Essentially a reverse-Schmidt, no claim was made that this same type of system could be used in photography.

Later in Germany the Schmidt telescope-camera was developed.

Science News Letter, August 14, 1948

Scheduled to be completed within another year, this telescope-camera will be located at Harvard's South African station. It is to be operated jointly by the Armagh Observatory of Northern Ireland, the Dun-sink Observatory of Eire, and Harvard Observatory.

The center of our Milky Way system is located in the constellation of Sagittarius, the archer. These star clouds are favorably located for studies at observatories in the Southwest United States, in Mexico, and especially in South Africa. They pass directly overhead at Harvard's Boyden Station at Bloemfontein, South Africa, where two of the world's largest Schmidts soon will start exploring them.

Science News Letter, August 14, 1948

ASTRONOMY

Giant World Telescopes

► THE MAJORITY of the world's most powerful telescopes are located in the United States. This list of the "giants" includes their size, when completed, where located, and by whom operated.

Outstanding among the reflecting (mirror) telescopes are:

200-inch, 1948, Palomar Mountain, Calif., California Institute of Technology and the Carnegie Institution of Washington.

120-inch-to-be, Mt. Hamilton, Calif., Lick Observatory of the University of California.

100-inch, 1917, Mt. Wilson, Calif., Mount Wilson Observatory of the Carnegie Institution of Washington.

82-inch, 1939, Mt. Locke, Tex., McDonald Observatory of the Universities of Texas and Chicago.

74-inch, 1948, Pretoria, South Africa, Radcliffe Observatory.

74-inch, 1933, Richmond Hill, Ontario, David Dunlap Observatory of the University of Toronto.

72-inch, 1919, Victoria, British Columbia, Dominion Astrophysical Observatory.

69-inch, 1932, Delaware, O., Perkins Observatory of Ohio Wesleyan University. Large refracting (lens) telescopes include:

40-inch, 1897, Williams Bay, Wis., Yerkes Observatory of the Universities of Chicago and Texas.

36-inch, 1888, Mt. Hamilton, Calif., Lick Observatory of the University of California.

32.7-inch, 1889, Meudon, France, Observatory of Paris.

31.5-inch, 1899, 1916, Potsdam, Germany, Astrophysical Observatory.

30-inch, 1914, Pittsburgh, Allegheny Observatory of the University of Pittsburgh.

30-inch, 1886, Nice, France, Bischoffsheim Observatory of the University of Paris.

Outstanding among wide-angle Schmidt camera-telescopes are:

60-inch-to-be, Bloemfontein, South Africa, Harvard College Observatory.

(Continued on p. 108)

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SUFFERN, N. Y.

Do You Know?

Persons can obtain *calcium* from milk, kale, collards, yellow cheese, mustard greens and turnip greens.

Disturbing *noises* of all kinds, from barking dogs to train whistles and flying planes, are being muffled by law in many American cities.

The 18-8 designation for stainless steel followed the discovery that a proportion of 18% chromium and 8% nickel in the steel was ideal for a great variety of steel products.

Mine-water problems in the Pennsylvania hard-coal region are of long standing but are growing worse; the average anthracite mine now pumps out about 13 tons of water for every ton of coal removed in comparison with an 8-1 ratio 25 years ago.

Hair molecules are long chains of atoms strung together with cross links, a scientist explaining the so-called *permanent wave* stated; in the waving process the cross links are broken, the hair formed into suitable shape, and cross links re-established.

48-inch, 1948, Palomar Mountain, Calif., California Institute of Technology and the Carnegie Institution of Washington.

48-inch-to-be, Upsala, Sweden, University Observatory.

32-inch Baker-Schmidt, scheduled for 1950, Bloemfontein, South Africa, Armagh Observatory of Northern Ireland, Dunsink Observatory of Eire and Harvard Observatory.

26-inch, 1942, Tonanzintla, Mexico, Mexican National Observatory.

24-inch, 1941, Oak Ridge, Mass., Harvard College Observatory.

24-inch, 1941, Cleveland, Case Institute of Technology.

Complete list of existing large telescopes is found in the appendix of *Telescopes and Accessories* (Blakiston Co.) by George Z. Dimitroff and James G. Baker.

Science News Letter, August 14, 1948

ISLAND LIFE in Lake Michigan

by Hatt, Van Tyne, Stuart, Pope and Grobman
A Study in zoogeography and habits of the land vertebrates

191 pp. 42 illustrations, bound
\$4.00 postpaid

Cranbrook Institute of Science
Bloomfield Hills, Mich.

AERONAUTICS-METEOROLOGY

Flying in Thunderstorms

► A STROKE OF LIGHTNING which hits an airplane flying through a thunderstorm usually does little physical damage to the plane itself but is rated as one of the greatest psychological hazards to the pilot.

The brilliant flash of the discharge, the smell of pungent ozone, the accompanying noise and concussion may frighten even the most experienced pilot, Maj. Gen. H. M. McClelland, U. S. Air Force, Commanding General of the Airways and Air Communications Services, declared. The general spoke as guest of Watson Davis, director of Science Service, on Adventures in Science, heard over stations of the Columbia Broadcasting System.

If the flash occurs at night and the pilot is temporarily blinded, he might find himself trying to fly instruments and seeing nothing but blurred gauges; in heavy turbulence that is not contemplated with any enthusiasm, he added.

The general summarized experiences and lessons learned in a recent Thunderstorm Project carried out in Florida and an Ohio-Indiana area as a joint undertaking by the Air Force, the Navy, U. S. Weather Bureau, National Advisory Committee for Aeronautics, with the Civil Aeronautics Administration and the Civil Aeronautics Board cooperating. The findings are of value to both military flying and civilian air transportation.

In these thunderstorm investigations, airplanes played an important part. Black Widow Night Fighters of the Air Force were used because of their rugged design. When an approaching storm was located by radar, a number of planes took off and entered the storm, stacked at 5,000-foot intervals from 5,000 to 25,000 feet in altitude.

They were equipped to record on film the data of special instruments for measuring the extent and speed of the great updrafts and downdrafts, in addition to the smaller-scale but violent turbulence and sharp accelerations encountered in the storms. They also carried instruments for measuring temperature and electrical field, and were equipped with radar.

During the thunderstorm seasons in Florida and Ohio 150 thunderstorm days were studied, and 1,363 airplane flights were made through them. During these 1,363 flights, planes were struck by lightning 21 times. No major damage was done to the aircraft. However, lightning strikes burned off radio antennas and static discharge wicks, drilled holes up to the size of a dime in wing tips, rudders and elevators.

In addition to the use of planes in the thunderstorm studies, swarms of balloons, a surface micronet and radar were used. All four components worked together as a coordinated team. The balloons gave additional details on thunderstorm structure and circulation. Some were followed by

radar, others were equipped with transmitters and were followed by radio direction finders. The micronet consisted of 55 ground stations, each equipped with many types of weather recording instruments. Radar followed planes and balloons in flight.

Science News Letter, August 14, 1948

INVENTION

Golfers Taught to Hold Heads Steady by New Device

► GOLFERS all know that not moving your head wrong has as much to do with the success of a stroke as moving the club's head right. But correction of that fatal tendency to raise your head, or to move it right or left, isn't easy unless you have some way of knowing which way you move it, and how much.

This is just what a new device, invented by A. M. Newman and R. V. Miller of Los Angeles, undertakes to do. The golfer first takes a correct stance, presumably under the direction of his "pro." Then a band is slipped around his head, and a cord led from this to a box of electrical gadgets before him on the ground.

When he makes his practice swing, flashing lights of three different colors—red, green and white—will tell in which direction his head moved. Buzzers are also rigged, to give mechanized Bronx cheers in three different tones, according to what he does wrong. If he does two wrong things at once, like raising his head and moving it to the right, he gets it double.

U. S. patent 2,445,839 has just been issued on the new mechanized golf instructor.

Science News Letter, August 14, 1948

Science Service Radio

LISTEN in to a discussion on research upon feelings and emotions on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p. m. EDST Saturday, Aug. 21. Watson Davis, director of Science Service, will have as his guests Dr. Martin L. Reymert, director of The Mooseheart Laboratory for Child Research, Mooseheart, Ill., and Malcolm R. Giles, executive director of the Loyal Order of Moose. They will report current findings in the application of psychology to everyday life, giving a forecast of the Second International Symposium on Feelings and Emotions to be held in Mooseheart and Chicago, Oct. 28-30.

Science News Letter, August 14, 1948

Not Too Late to Start A Garden!

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Earliana tomato	Okra
Globe radish	Soya bean
Ornamental gourds	
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ABOUT COSMIC RAYS—John G. Wilson—*Sigma*, 144 p., illus., approx. \$2.65. Written by a British author for the general reader.

AUSTRALIAN JOURNAL OF SCIENTIFIC RESEARCH, SERIES A, PHYSICAL SCIENCES: VOLUME 1, NUMBER 1—N. S. Noble—*Council for Scientific and Industrial Research*, 119 p., illus., \$5.00 per year, \$1.25 single copy. A new medium for the publication of research papers regardless of the country of origin.

AUSTRALIAN JOURNAL OF SCIENTIFIC RESEARCH, SERIES B, BIOLOGICAL SCIENCES: VOLUME 1, NUMBER 1—N. S. Noble, Ed.—*Council for Scientific and Industrial Research*, 162 p., illus., \$5.00 per year, \$1.25 single copy. A new journal devoted to reports of research in various fields of biology. Subscriptions to these two journals should be sent direct to the publisher, 314 Albert Street, East Melbourne, C. 2, Victoria. It may be necessary to pay postage on foreign subscriptions.

THE HARLEM HOSPITAL BULLETIN: Volume 1, Number 1—*Harlem Hospital Clinical Society, Inc.*, 44 p., illus., quarterly, \$2.00 per year, single copies 50 cents. The papers included will not be limited to any specialty nor to members of the hospital staff. Correspondence should be addressed to Mrs. Arthur H. Aufses, Editor, Harlem Hospital, 136th St. and Lenox Ave., New York 30, N. Y.

FOODS: PRODUCTION, MARKETING, CONSUMPTION—Jean J. Stewart and Alice L. Edwards—*Prentice-Hall*, 2d ed., 490 p., illus., \$6.35. For those concerned with providing food for families, institutions or communities as well as for students of home economics.

HANDBOOK OF SCIENTIFIC AND TECHNICAL SOCIETIES AND INSTITUTIONS OF THE UNITED STATES AND CANADA—Callie Hull, S. J. Cook and J. R. Kohr—*National Research Council*, 5th ed., 371 p., \$5.00. Useful information about 1,302 organizations in the United

States and 166 in Canada, alphabetically arranged by name of society.

HOW TO CHOOSE AND USE YOUR WASHING MACHINE—*Bureau of Human Nutrition and Home Economics, U. S. Department of Agriculture*, 16 p., illus., paper, free upon request to U. S. Department of Agriculture, Washington 25, D. C. Useful advice to owners and prospective owners of washing machines.

HUMAN NUTRITION—V. H. Mottram—*Williams & Wilkins*, 151 p., illus., \$2.75. Of British origin, this book is intended to meet the crying need for training in dietetics in this "fearsome period of austerity for almost the whole globe."

PREVENTING AND REMOVING MILDEW—HOME METHODS—Margaret S. Furry—*Bureau of Human Nutrition and Home Economics, U. S. Department of Agriculture*, 10 p., illus., paper, free upon request to U. S. Department of Agriculture, Washington 25, D. C. Timely and authoritative counsel on treatment of textiles, upholstered furniture, books, leather, and other household goods.

SECOND REPORT TO CONGRESS ON THE UNITED STATES FOREIGN AID PROGRAM FOR THE PERIOD ENDED MARCH 31, 1948—*Department of State—Govt. Printing Office*, 138 p., illus., paper, 35 cents. Tucked in among the facts and figures of this official report is a letter from 8-year-old Anne-Marie Pocreau of France saying "thank you to all the Americans whom we like very much."

STRUCTURE OF TYPICAL AMERICAN OIL FIELDS: Volume III: A Symposium on the Relation of Oil Accumulation to Structure—J. V. Howell, Ed.—*American Association of Petroleum Geologists*, 516 p., illus., \$4.50. This volume includes fields that are in some way unusual, either in size, type of structure, discovery method, location or significance.

WASHINGTON WITCH HUNT—Bert Andrews—*Random House*, 218 p., \$2.50. The case of Mr. Blank who was discharged from the State Department as a "potential security risk" without being told what charges were brought against him is something to alarm every U. S. citizen. The threat to fundamental liberties in this and other cases is reported here by Pulitzer prize winner and chief of the Washington Bureau of the New York Herald Tribune.

Science News Letter, August 14, 1948

ELECTRONICS

Synthetic Mica Suitable For Communications

► MAN-MADE MICA, with the electrical characteristics of natural mica, is now being produced in the United States, it was revealed by the U. S. Army and the Navy. Both had a hand in the research program which developed the new synthetic product.

Great quantities of mica are required in America each year in many types of electrical equipment, particularly in condensers and other circuit elements. It is used in large amounts as insulation in electrical

machinery and as a dielectric in electronic circuits. It plays a big part in radio and radar. No domestic deposits of suitable mica have yet been found in America large enough to meet the needs. The volume supply in the past came principally from India and Brazil. The new synthetic may make further importation unnecessary.

The interest of the Army and the Navy in the development of a mica substitute is due to the fact that both are large users of this material in their communications and other equipment. They rate mica as a strategic mineral, one necessary to stockpile for future emergencies if there were no substitute.

Known as fluorine-phlogopite mica, the new synthetic is now being produced on a pilot-plant scale. It has the desirable characteristics of natural mica, including perfect cleavage into thin sheets, good electrical and mechanical properties, and chemical stability. It is expected to replace the muscovite and phlogopite forms of natural mica, the silicate minerals that the United States has been importing in large quantities.

Considerable work has been done in the past few years looking toward the development of a synthetic mica or a mica substitute. Government-sponsored research on mica synthesis was initiated at the Colorado School of Mines in June, 1946, under an Army Signal Corps contract. Later the U. S. Bureau of Mines began synthetic mica pilot-plant work at Norris, Tenn., under a contract with the Office of Naval Research. Owens-Corning-Fiberglas Corporation, serving under a consulting contract, furnished accumulated information gathered in two years of research, in 1945-46, in a mica synthesis program. Other groups also assisted.

Science News Letter, August 14, 1948

VETERINARY MEDICINE

Brucellosis Attacks Many Veterinarians

► A WARNING that the entire veterinary medical profession is threatened by a disease of animals has been sounded by Dr. Thurman B. Rice, professor of public health at Indiana University.

Dr. Rice reports statistics show that half of the veterinarians engaged in large-animal practice have had brucellosis, known as undulant fever in man.

In the central-west, he estimates that as many as 90% of the veterinarians have the disease or have had it.

Hogs are rated the most dangerous source of infection, but cattle, goats, sheep, horses and occasionally dogs may pass on the disease. The germ enters the human body not only through a skin abrasion or the membrane of the eye but also through normal skin.

Research workers handling infected animals "are nearly sure to get the disease," Dr. Rice warns.

Science News Letter, August 14, 1948

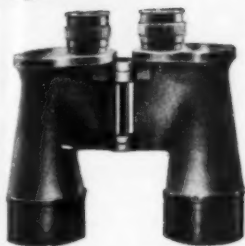
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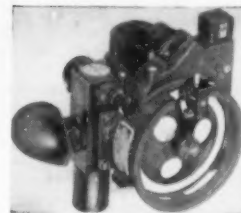
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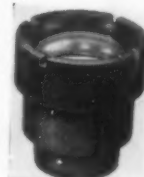
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✿ **FULL-VIEW GOLF** bag, about one-third the length of ordinary bag, is made of lightweight plastic and aluminum and has slots for 12 clubs with the shaft of each held firmly in a separate space by means of a locking mechanism. Clubs do not touch each other, and the one wanted can be released from its lock by a finger flick.

Science News Letter, August 14, 1948

✿ **ADHESIVE PLASTER**, which can remain on the body of a patient for long periods without irritating the skin, contains two fatty acid salts of zinc: zinc propionate and caprylate, respectively. These substances combat the growth under the plastic of bacteria which cause the irritation.

Science News Letter, August 14, 1948

✿ **CLOTH CUTTER**, for home dress-makers, is a "pinkie" that cuts without a blade and never needs sharpening. It produces a non-raveling bias-cut zigzag by means of two steel disks, instead of by shears, with rotary action worked by conventional scissors handles.

Science News Letter, August 14, 1948

✿ **FLIPPER, FOR PANCAKES**, meatballs and eggs, shown in the picture, resembles the ordinary kitchen article but



turning is accomplished without twisting the wrist. Thumb pressure on a lever rotates the patty-holding end of the flipper, turning it upside down.

Science News Letter, August 14, 1948

✿ **CAKE CUTTER AND SERVER**, usable with cheese and other foods, is a keen-edged knife with a blade that curves backward near its extremity, bearing fork-like tines at its end. The short flat-tined fork prevents the food from splitting while being transferred to a plate.

Science News Letter, August 14, 1948

✿ **DESK-TYPE FACSIMILE** machine permits the sending and receiving of telegrams direct from the executive's desk. The outgoing message, written or typed, is placed on the cylinder of the typewriter-sized machine, a button pressed, and electrical impulses, transmitted as a stylus passes over the copy, flash over the wire to make an exact pictorial reproduction at the receiving end.

Science News Letter, August 14, 1948

✿ **IMPROVED CARBINE** for general hunting has a hinged forearm at the front end of the stock under the barrel which can be turned down to form a five-inch grip or rest. It snaps up instantly for carrying or for use as a convenient firearm. This 37-inch carbine of .22 caliber is similar in design to the Army's M-1 carbine.

Science News Letter, August 14, 1948

• Nature Ramblings by Frank Thone •

► **GRASSES**, among the meekest of all the world's green folk, at last receive their meed of praise: the entire Yearbook of Agriculture for 1948, newly published by the U. S. Department of Agriculture (\$2), is devoted to them and their manifold uses. Several scores of scientists in the Department and elsewhere have contributed to its chapters, under the general editorship of Alfred Stefferud.

The seeming meekness of the grasses is deceptive, it appears from an examination of the important chapter by Mrs. Agnes Chase, one of the world's leading researchers on grass botany. Grasses evolved late, at about the time when hoofed mammals were beginning to become important on earth. Their flowers are small, lacking the conspicuous petals and sepals of more easily recognizable blossoms; hence they have been put near the bottom of the botanical scale by earlier classifiers of plants. But this

The Blessed Meek



turns out to be a simplicity of efficiency; stripping away all non-essential parts has enabled grasses to do their business in the world with most amazing success.

Grasses, Mrs. Chase points out, pioneer into the toughest situations. They are the

outmost seed plants in polar regions; only the far more primitive lichens and algae go beyond them. They hold the drifting sands of dunes, the shifting and eroding soils of gulleys and the cuts, fills and other man-made wastelands created by engineering works. The big, tough kind known as cordgrass has built millions of acres of shorelands out of what were once tidal flats, the sport of the sea.

Grasses, the other writers remind us, in chapter after chapter, have their impact on man's life in a hundred ways. They feed his livestock in pasture and from the silo, they beautify his parks and lawns, they give a footing to his sports from football to golf. Finally, as corn, wheat, rye, barley, rice and sugarcane, they feed him; and as bamboos they offer materials for furniture and tropical housing.

Science News Letter, August 14, 1948